



## IRPWind ScanFlow Public database

**Wagenaar, J.W.; Hasager, Charlotte Bay; Bergman, G.; Mikkelsen, Torben Krogh; Alting, I.; Angelou, Nikolas; Pedersen, Claus Brian Munk**

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J.W. Wagenaar<sup>1</sup>, C. Hasager<sup>2</sup>, G. Bergman<sup>1</sup>, T. Mikkelsen<sup>2</sup>, I. Alting<sup>1</sup>,  
N. Angelou<sup>2</sup>, C.B.M. Pedersen<sup>2</sup>

1. ECN, Unit Wind Energy, P.O. Box 1, NL 1755 ZG Petten, Netherlands  
2. DTU Wind Energy, Risø campus Frederiksborgvej 399, DK-4000, Roskilde, Denmark

## ScanFlow project

ECN and DTU have set-up an extensive measurement campaign at the ECN test site to characterize the wind turbine inflow wind field. The campaign comprises nacelle LiDAR, short range scanning LiDAR, meteorological mast, ground based LiDAR and turbine measurements. It is put up in the framework of IRPWind 1<sup>st</sup> call for joint projects.

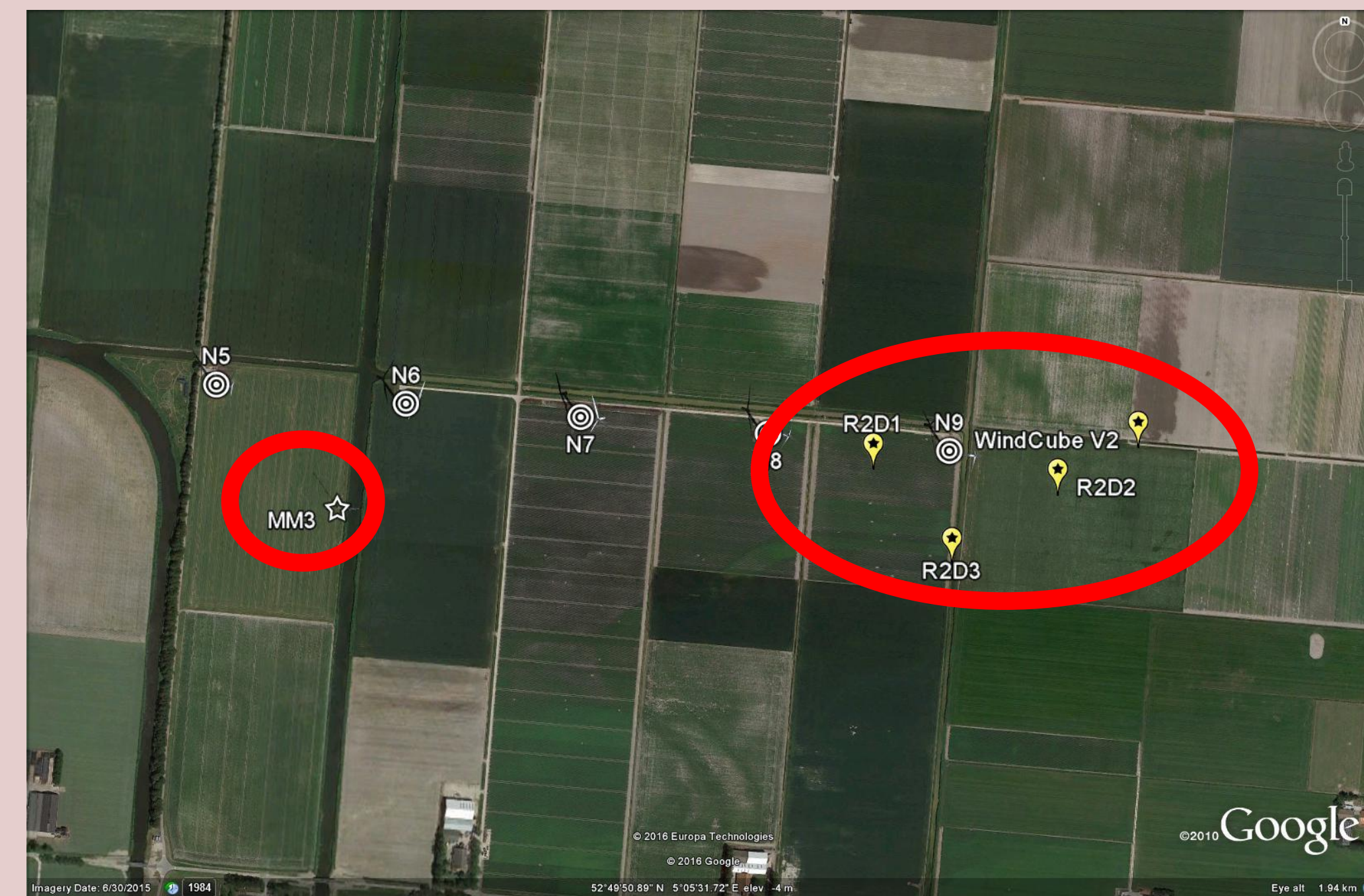
**ScanFlow project:** “High-resolution full-scale wind field measurements of the ECN’s 2.5 MW aerodynamic research wind turbine using DTU’s 3D WindScanner and SpinnerLidar for IRPWind’s and EERA’s benchmark”.

**Aim:** The aim is to establish a unique turbine power performance and induction zone measurement dataset for benchmark purposes.

### Key Performance Indicators

- 2 weeks of short-range windscanners (3x)
- 6 weeks of nacelle LiDAR measurements
- 6 weeks of ground based LiDAR, meteorological mast and turbine data
- Public database

## Experimental set-up



*Layout of the test site with turbine, mast and LiDARs indicated.*

### ECN Test Site

- 50km North of Amsterdam
- Flat terrain
- 5 research turbines
- West to East line configuration

### Turbine (N9):

- 1<sup>st</sup> from East
- Nordex 2.5MW
- H=D=80m

### WindCube V2:

- 2.5D from turbine
- East

### IEC mast (MM3):

- 1km from turbine
- West
- Ws, wd, T, P, TI, etc.

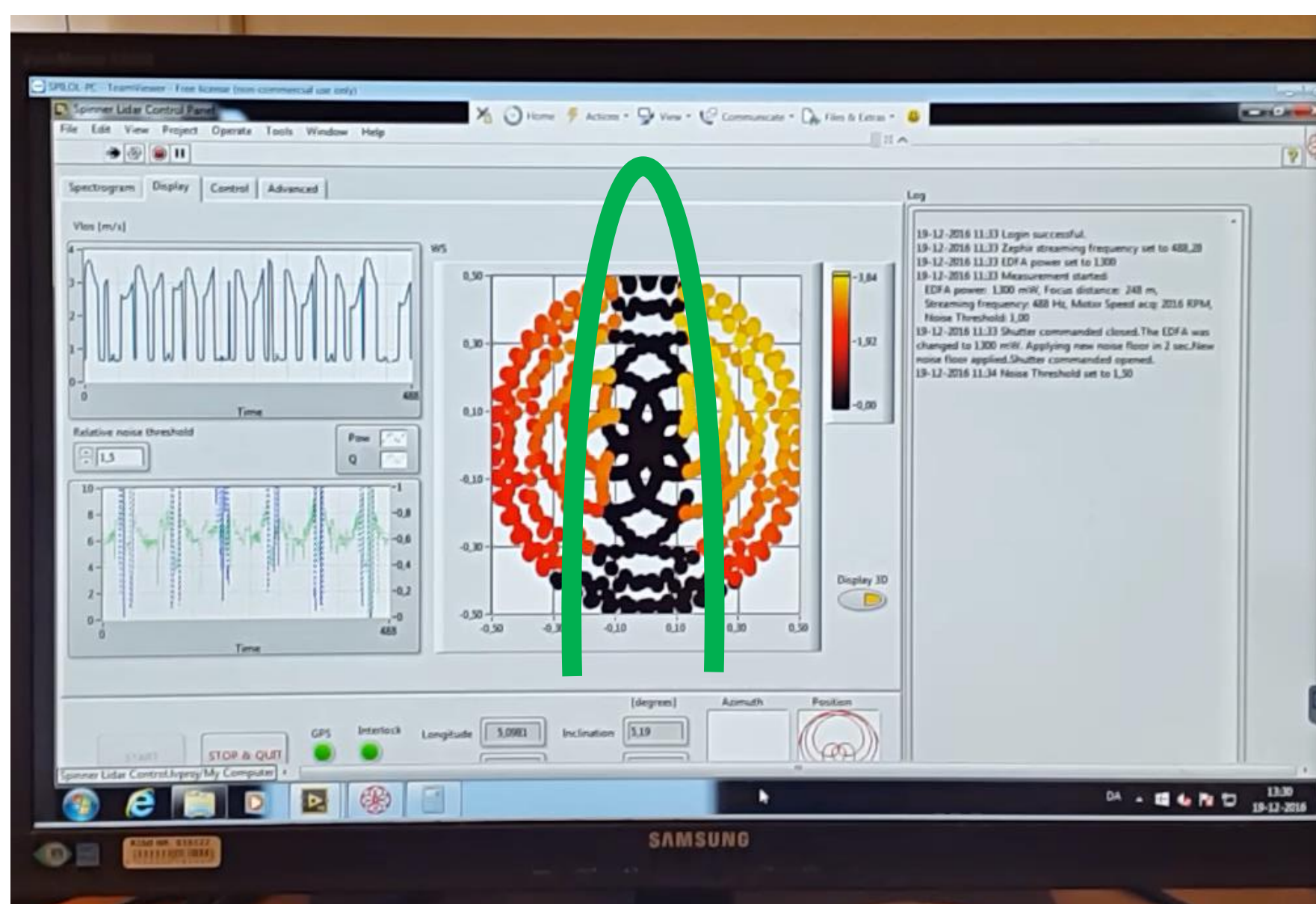
### Nacelle LiDAR:

- Cooler mounted
- Scanpattern
- ~0.8D in front rotor

### Short range

### windscanners:

- R2D1, R2D2, R2D3
- Scanpattern
- ~0.8D in front of rotor



*Nacelle LiDAR measurement with blade passage*



*Nacelle LiDAR installation*



*Instrumented research turbine*



*Short range windscanner*

## Public Database

### Data Download Scheme:

#### 1. Registration

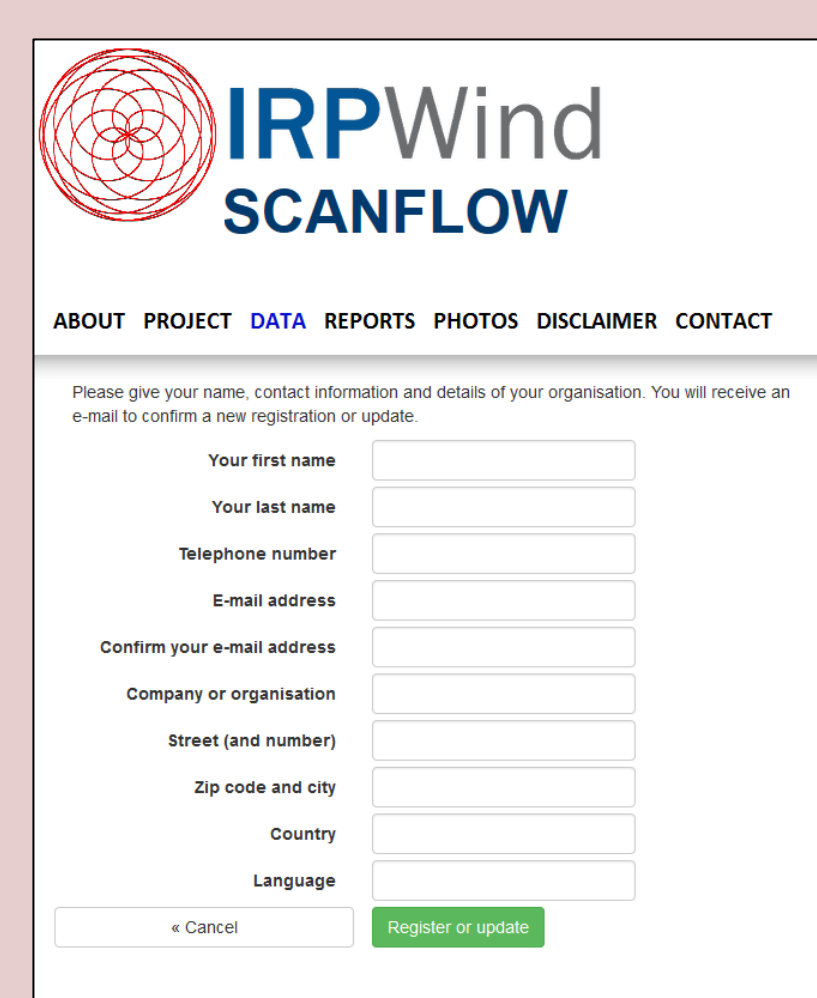
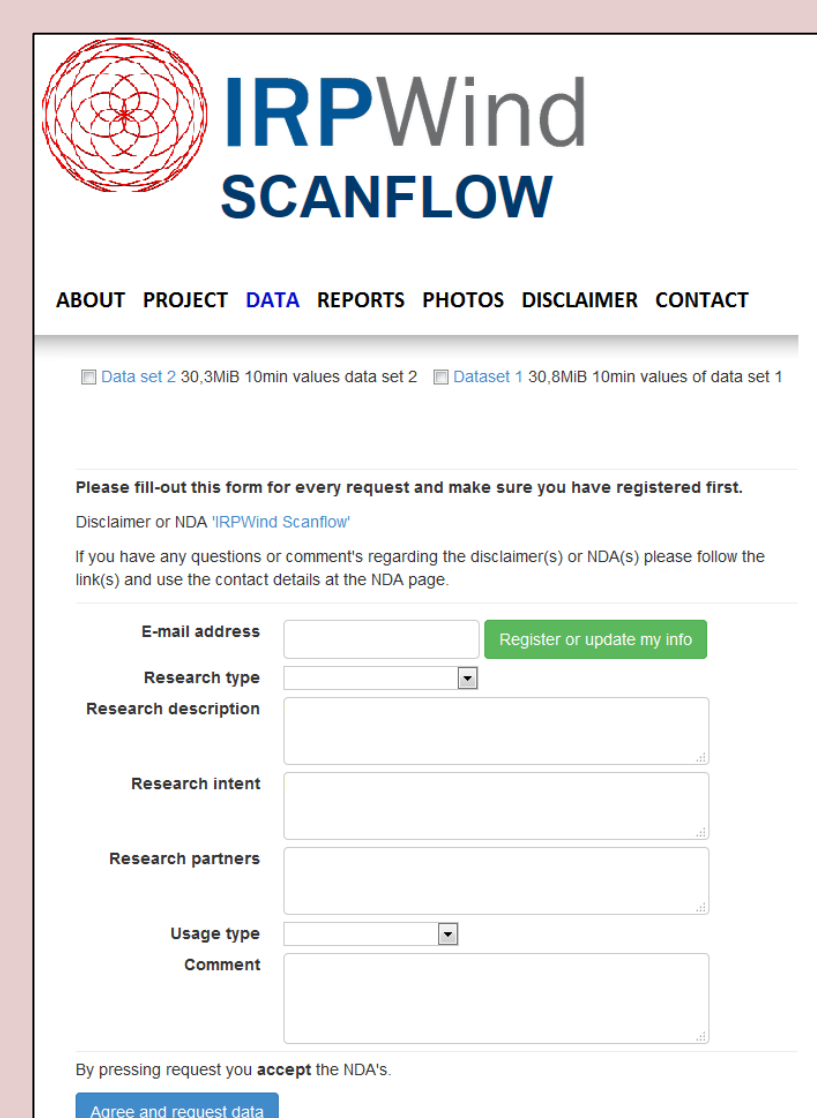
- Go to [www.irpwind-scanflow.eu](http://www.irpwind-scanflow.eu) website and click on 'DATA'
- Register as new user
  - An email is send to the new user
- Confirm the registration

#### 2. Data selection

- Go to [www.irpwind-scanflow.eu](http://www.irpwind-scanflow.eu) website and click on 'DATA'
- Fill out form and click 'Agree and request data' (the NDA/DISCLAIMER is accepted)
- Data request is being considered

#### 3. Data request evaluation

- The request is being evaluated by the project data maintainer/owner
  - Deny. User receives email with denial motivation
  - Accept. User receives email with a download link, which is temporarily valid
- Download the data

Available data			
MM3	Wind speed 52m, 80m, 108m	Turbine	PLC Yaw
	Wind direction 52m, 80m, 108m		PLC Power
WindCube V2	RHT 80m		PLC Rotational speed
	Pressure 80m		PLC Status (binary)
Nacelle LiDAR	TI		
Short range scanner R2D1	Horizontal wind speed	Short range scanner R2D2	Time
	Vertical wind speed		X coordinate of a right-handed Cartesian coordinate system.
Short range scanner R2D2	Wind direction		Y coordinate of a right-handed Cartesian coordinate system.
	Data availability		Z coordinate of a right-handed Cartesian coordinate system.
Short range scanner R2D3	40m, 50m, 60m, 70m, 80m, 90m, 100m, 110m, 120m, 130m		Radial wind speed
			U-component wind vector
Nacelle LiDAR	Time		V-component wind vector
	Index: sample number in scan pattern		W-component wind vector
Nacelle LiDAR	LOS velocity		Scan pattern index
	Quality		Quality index velocity estimation
Nacelle LiDAR	Power in spectrum		Max power
	Azimuth		Total power Doppler spectrum
Nacelle LiDAR	x-component unit vector		# measurements per point
	y-component unit vector		Status
Nacelle LiDAR	Focus distance		
	Inclination		
Nacelle LiDAR	ScalingFactor		

## Acknowledgements

The work described here has received support from IRPWind, a project that has received funding from the European Union's Seventh Programme for Research, Technological development and Demonstration.

## Final Statement

In the ScanFlow project various measurements are being performed to characterize the inflow wind field. These data will publically become available at the end of the project (February 2017) via the website [www.irpwind-scanflow.eu](http://www.irpwind-scanflow.eu). Related websites and important links are [www.irpwind.eu](http://www.irpwind.eu), [www.windbench.eu](http://www.windbench.eu) and [www.windscanner.net](http://www.windscanner.net).

